

## ***Memorandum For The Record***

5 March 2003

SUBJECT: Third Meeting of the Upper Mississippi River Headwaters ROPE Study  
Environmental Task Force.

1. Participants: Minnesota Department of Natural Resources (MNDNR): Steve Marod, Donald Pierce, Chris Kavanaugh, Howard Christman, Jim Lilienthal, Ray Norrgard  
Minnesota Pollution Control Agency (MCPA): Ken LeVoir  
Corps of Engineers (COE): Dennis Holme, Steve Clark
2. On March 4, 2003, the individuals listed above met at the Minnesota Pollution Control Agency (MPCA) office in Brainerd, Minnesota, for the third meeting as the Environmental Task Force (ETF) of the Upper Mississippi River Headwaters ROPE Study. Prior to the meeting, Steve Clark sent out an agenda (see attachment). The meeting agenda was generally followed.
3. It was explained to the group that the Delivery Team has not reached consensus but will likely agree that an optimization model will be used in the ROPE study.
4. The general concepts of an optimization model were explained. A preliminary draft map of the points of interest (nodes) in the Headwaters region for inclusion in an optimization model was presented to the group. This map, along with a table listing the type of hydrologic modeling being proposed for each node, will be sent out to the ETF for review and comment.
5. There were some concerns that the hydrologic modeling would not include the effects of tributaries entering Mud Lake. These tributaries can have a major impact on operation at the Mud Lake dam. The MNDNR has installed staff gages on these tributaries but does not feel they have collected enough data to develop rating curves.
6. A brief history of the development and use of the 1963 MNDNR low-flow guidelines was presented, followed by a group discussion of the issue. In general, the group felt that they needed to see the results of the without-dam hydrologic modeling to decide whether or not the low-flow guidelines were adequate. There were no strong opinions regarding the adequacy of the present guidelines. I told the group that the existing and without-dam hydrographs would be made available to them soon after their completion.
7. Related to low flows and drought conditions, it was requested that the ROPE evaluate travel-time from the Headwaters reservoirs to the Twin Cities, and the attenuation of water between those locations. A search of existing literature on this subject will be conducted.
8. The guidelines regarding discharge rates-of-change at the Headwaters reservoirs were discussed. No problems were identified that were likely related to the present guidelines. It was decided that the guidelines would be assumed to be adequate at this time, but changes may be recommended as the ROPE progresses.

Attachment  
Agenda

Steve Clark, COE  
Environmental Task Force Coordinator

**Upper Mississippi River Headwaters ROPE Studies  
Environmental Task Force Meeting – 4 March 2003  
MPCA Office in Brainerd**

***AGENDA***

**Start at 10:00 a.m.**

**1) Introductions**

**2) Status of ROPE**

- a) A summary of reservoir operating rules and normal operating conditions and practices is nearly complete and will be sent to the group soon.
- b) Hydrographs for existing and without-dam conditions are not ready.
- c) The Delivery Team has not reached a consensus but will likely agree to use some type of an optimization model.
  - i) Regardless of the model chosen, a few basic components are needed.
    - (1) Identify points of interest (nodes in PRM).
    - (2) Articulate preferred condition.
    - (3) Develop penalty/benefit curves for each time step of each point of interest.
    - (4) PRM returns optimized stage/discharge for period of record.
    - (5) Use hydrologic model to develop rules that would have resulted in optimized stage/discharge.
  - ii) ETF must identify points of importance in the system (Nodes) and develop ideal hydrographs for each – without dam hydrographs.
    - (1) Handout of preliminary points of interest.
    - (2) Gather group input as related to hydrologic modeling map handed out at last ETF meeting.

**3) Low-Flow Guidelines for Headwaters Reservoirs**

- a) To conduct hydrologic modeling, we must set low-flow guidelines.
- b) Current low-flow guidelines were set by the MNDNR in 1963 (see handout).
- c) During drought of 1988 and 1989, release rates went only to the first level of low flow. There were no reports of problems by the MNDNR at that time.
- d) Discussion of the relevancy of these guidelines and the need for further evaluation.

**4) Rates of Change**

- a) Rates of change must also be set for hydrologic modeling.
- b) Current rates of change were also established by the MNDNR in 1963 (see handout).
- c) Discussion of the relevancy of these guidelines and the need for further evaluation.

**5) Schedule Next ETF Meeting?**

**Close Meeting at 12:00 noon**

**Table 1**  
**Mississippi River Headwaters Reservoirs System**  
**Operating Elevations in 1929 NGVD and Stages in Feet**

	<b>Winni- bigoshish</b>	<b>Leech</b>	<b>Poke- gama</b>	<b>Sandy</b>	<b>Cross L. Pine R.</b>	<b>Gull</b>
<b>1. Normal Summer Range/Band Stage in Feet Middle of the Summer Band Elev.</b>	1297.94-1298.44 9.0 - 9.5 1298.19	1294.50-1294.90 1.8 - 2.2 1294.70	1273.17-1273.67 8.75 - 9.25 1273.42	1216.06-1216.56 8.75 - 9.25 1216.31	1229.07-1229.57 12.75 - 13.25 1229.32	1193.75-1194.00 6.0 - 6.25 1193.87
<b>2. Ordinary Operating Limits Stage in Feet</b>	1296.94-1300.94 8.0 - 12.0	1293.20-1295.70 0.5 - 3.0	1270.42-1274.42 6.0 - 10.0	1214.31-1218.31 7.0 - 11.0	1227.32-1230.32 11.0 - 14.0	1192.75-1194.75 5.0 - 7.0
<b>3. Present/Total Operating Limit Stage in Feet (2002)</b>	1294.94-1303.14 6.0 - 14.2	1292.70-1297.94 0.0 - 5.24	1270.42-1278.42 6.0 - 14.0	1214.31-1221.31 7.0 - 14.0	1225.32-1235.30 9.0 - 18.98	1192.75-1194.75 5.0 - 7.0
<b>4. Federal Regulations, Title 33, Min. Level and Average Annual Flow</b>	1294.94 / 6.0 150 cfs	1292.70 / 0.0 70 cfs	1270.42 / 6.0 200 cfs	1214.31 / 7.0 80 cfs	1225.32 / 9.0 90 cfs	1192.75 / 5.0 30 cfs
<b>5. Public Law 100-676, Sect. 21 Cong. Notification Levels, WRDA 88</b>	1296.94/1303.14 8.0 / 14.2	1293.20/1297.94 0.5 / 5.24	1270.42/1276.42 6.0 / 12.0	1214.31/1218.31 7.0 / 11.0	1227.32/1234.82 11.0 / 18.5	1192.75/1194.75 5.0 / 7.0
<b>6. MN Dept. of Natural Resources Minimum Flow Guidelines Minimum Release Elevation, Stage and Minimum Flow</b>	≥ 1294.94 / 6.0 100 cfs, < 1294.94 50 cfs	≥ 1292.70 / 0.0 100 cfs, < 1292.70 50 cfs	(See Note No. 6.)	≥ 1214.31 / 7.0 20 cfs, < 1214.31 10 cfs	≥ 1225.32 / 9.0 30 cfs, < 1225.32 15 cfs	≥ 1192.75 / 5.0 20 cfs, < 1192.75 10 cfs
<b>7. Flowage Rights Acquired To Elev.: Stage in Feet</b>	1306.86 17.92 +	1301.94 9.24 +	1280.42 16 +	1222.31 15 +	1238.82 22.5 +	1194.75 7
<b>8. Est. Downstream Chan. Cap., cfs</b>	2,000	1,500	6,000	(8.)	2,000-2,500	950
<b>9. Flood Operation, Control Points</b>	Aitkin/Pokegama	Aitkin/Pokegama	Aitkin/Sandy	Aitkin	Ft. Ripley, etc.	As Needed
<b>10. Fish Spawn, Operation Guidelines</b>	Fish Spawn	-----	-----	-----	Fish Spawn	-----
<b>Gage Zero Elevation, 1929 NGVD</b>	1288.94	1292.70	1264.42	1207.31	1216.32	1187.75

1. The most desirable levels for the summer season.
2. The Ordinary Operating Limits represent the range that minimizes the degree of high and low water damages. The lower limit is the normal drawdown target level for high snow water content, the exception being Leech which uses 1293.80.
3. The Present Operating Limits are in accordance with the latest regulations from Congress or subsequent studies. The upper and lower limits provide maximum storage for flood control and other purposes.
4. Title 33, Code of Federal Regulations, Sect. 207.340(d) prescribes the minimum operating limits and minimum average annual discharges as set forth in the 1936 and (for Leech) 1944 regulations.
5. Public Law 100-676, Section 21, of the Water Resources Development Act of 1988 requires the Secretary of the Army to notify Congress 14 days prior to a reservoir being below the minimum or above the maximum listed here. The District will notify the Secretary well in advance of the 14-day period.
6. The MDNR elevation and flows are based on an informal agreement between the Corps and the MN Department of Natural Resources and are followed after taking measures to insure the Federal average annual flow requirement is met. When Pokegama is below elevation 1273.17 ft., releases are limited to the sum of the Winni. and Leech discharges. In addition, 200 cfs has been adopted as the minimum discharge when Pokegama is at or above elevation 1273.17 ft.
7. Flowage rights on the Cass Lake Chain obtained to elevation 1307.86 (18.92 ft. stage).
8. The channel below Sandy Lake is affected by backwater from the Mississippi River. The channel capacity below the confluence of the Mississippi River and the Leech Lake River is 2,200 cfs. High flows in the 2,000 to 2,500 cfs range from Pine River Dam cause high water problems on Big Pine Lake.
9. 1912 M.S.L. adjustment information for the Pine River Dam gage zero is not available.

**Table 2**  
**Mississippi River Headwaters Dams**  
**Minnesota Department of Natural Resources Guidelines for Rate of Release Changes**

<b>Dam</b>	<b>Rate of Release Guideline</b>
<b>Winni- bigoshish</b>	For increases and decreases, limit changes to approximately 200 cfs per day or a change in the tailwater elevation of not more than 0.5 foot. No more than a 10% change in outflow in any 2-hour period when the USGS gage at Grand Rapids reports an average daily flow of 400 cfs or less. No restriction when operating for walleye spawning.
<b>Leech</b>	For increases and decreases, limit changes to approximately 100 cfs per day or a change in the tailwater elevation of not more than 0.25 foot.
<b>Pokegama</b>	Reasonable judgment must be exercised. In general, changes are limited to 20-30% of the total flow except when operating for flood control and/or to prevent property damage. No more than a 10% change in outflow in any 2-hour period when the USGS gage at Grand Rapids reports an average daily flow of 400 cfs or less.
<b>Sandy</b>	No guideline was provided. Reasonable judgment must be exercised. In general, changes are limited to 20-30% of the total flow except when operating for flood control and/or to prevent property damage.
<b>Pine/Cross Lake</b>	For increases and decreases, limit changes to approximately 60 cfs per day or a change in the tailwater elevation of not more than 0.25 foot except when operating for flood control and/or to prevent property damage.
<b>Gull</b>	No guideline was provided. Reasonable judgment must be exercised. In general, changes are limited to 20-30% of the total flow except when operating for flood control and/or to prevent property damage.

Note on Source: Plan of Operation, Mississippi River Headwaters, Minnesota Department of Conservation, Division of Fish and Game, 15 August 1963. Not applicable when operating for flood control and/or to prevent property damage. During other times, reasonable judgment must be exercised. For example, a large percent increase or decrease in the magnitude of the flow is not advisable (e.g., going from 300 cfs to 100 cfs in one move). The District's Environmental Section should be consulted when changes are being made during critical flow periods, particularly during low-flow conditions. Two or three gate changes per day may be necessary during critical flow periods to alleviate stress to fish and wildlife resources. For the 10 percent guideline at Winnibigoshish and Pokegama, see February 1997 MNDNR letter.